

## REMARKS

This is in response to the January 25, 2006 office action in which the Examiner rejected all of the claims on the basis of prior art under Sections 102 or 103 and also rejected some of the claims on the basis of double patenting based on US Patent No. 6,641,663. The oath was also objected to and several errors in the specification were noted.

First, applicant has amended the specification to address these errors.

Second, applicant respectfully traverse the Examiner's finding that the declaration is defective. Applicant's copy includes a mailing address for each inventor. Another copy is attached to this amendment. Applicant requests reconsideration and withdrawal of this finding.

Third, applicant has amended claim 44 by adding a limitation that defines an inner layer thickness in the range of .2mm to less than .5mm. This limitation corresponds to allowed claim 1—directed to a crucible—in the parent application, from which the claims in this application were restricted. Similarly, applicant has amended 52 to further define the homogeneously aluminum-doped layer as having a depth in the range of .2mm to less than .5mm and being homogeneously doped with aluminum in the range of about 50-500ppm. This corresponds to the limitations of allowed claim 17—also directed to a crucible—in the parent application.

Fourth, applicant has amended claim 60 to incorporate the limitations of dependent claim 69. Applicant respectfully traverses the rejection of claim 69 on the basis of Watanabe *et al.* in view of Sato *et al.* Admittedly, Sato *et al.* teaches control of silica grain sizes when making silica glass. This teaching, however, is for producing a solid block of high purity silica glass having fine bubbles that are uniformly dispersed at high density. In contrast, applicant's non-homogeneously doped inner wall portion is to promote crystallization of silica. Application, page 6, lines 10 *et seq.* In other words, applicant is not controlling silica grain size throughout, but rather is controlling grain size of coarse quartz grain coated with aluminum that is used to dope a single layer on a silica crucible. What is more, the grains that form applicant's inner layer are melted in a very strong plasma field rather than being fused as described in Sato *et al.* Application, page 11, lines 6 *et seq.*

In sum, teaching controlling silica grain size in a fusion process to form a block of highly pure silica does not disclose or suggest controlling the size of aluminum-coated quartz grains that are melted to form an inner crucible layer that promotes crystallization. Reconsideration of this rejection is requested.

Fifth, applicant has also added new claim 73 and claims depending therefrom that are similar to some of the claims depending from claim 60. Claim 60 as amended is directed to non-homogeneous doping using coated grains. New claim 73 is directed to such doping using a mixture of aluminum-doped silica grain and non-doped silica grain and more specifically to such doping that forms an inner layer doped with less than 100 ppm aluminum. Support for this limitation is found in the application on page 20, line 13.

The Examiner has cited Nunome for a crucible outer layer made of silica grains doped with aluminum having a concentration of 50-120 ppm. Nunome, however, teaches away from an inner doped aluminum layer of any concentration. As can be seen by reading the Related Art section in the English translation, the goal in Nunome is to create the purest possible inner layer to prevent contamination of the silicon ingot formed during the CZ process. The present invention, however, dopes the inner layer with aluminum to prevent or retard roughening of the inner crucible surface during the CZ process. This aspect is explained in the application beginning on page 17. The doping can be utilized to crystallize the inner surface to prevent or retard creation of rosettes, to permit growth of the rosettes but to prevent or retard generation of rough areas in the rosettes, or to stifle rosette growth by surrounding each rosette with crystalline silica. All of these modes are achieved by an aluminum-doped inner layer, which Nunome teaches away from by promoting a high purity silica inner layer.

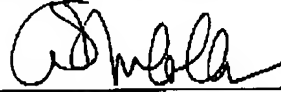
New claims 84 and 85 further define the inner layer depth with support being found in the application at page 15, line 6, and at page 15, line 10, respectively.

Finally, applicant requests reconsideration of the double patenting rejection in view of the amendments to each of the independent claims, 44, 52, and 60, rejected on this basis. Claims 44 and 52 were amended to correspond to limitations in issued claims in the parent of this application. And claim 60 was amended to incorporate the limitations of claim 69, which was not rejected for double patenting. Applicant requests that the double patenting rejection be withdrawn in view of these amendments.

For the foregoing reasons, reconsideration and allowance of the claims as amended is solicited. The Examiner is encouraged to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

Respectfully submitted,

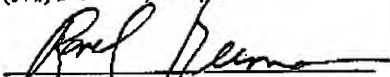
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I hereby certify that this correspondence  
is being transmitted to the U.S. Patent and  
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(571) 273-8300, on April 24, 2006.

  
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